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Collard & Roe
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Roslyn, NY 11576

EXAMINER

BROWN, JENNINE M

ART UNIT	PAPER NUMBER
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1755

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/786,163

Applicant(s)

WOLF ET AL.

Examiner

Jennine M. Brown

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-15, 17 and 18 is/are pending in the application.
- 4a) Of the above claim(s) 3-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Election/Restrictions

Claims 3-15 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on April 07, 2005.

Applicant elects the single solid catalyst species with sub species chemical properties $V_{0.19}Mn_{0.24}Fe_{0.32}Ga_{0.25}O_x$ (Table 8) with traverse. The reply states that claim 18 reads on this species.

PCT and European patent laws and classification are not abided by in US practice. Applicant's arguments do not specifically point out any error in the restriction (election) requirement presented by Examiner only argue why the claims allegedly are concrete and tangible, therefore the restriction requirement is made final.

Claim Objections

Applicant's amendment obviates Examiners previous objection, therefore the previous objection has been withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 17 and 3-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which

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was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

1. Applicant has amended claim 17 to read "A method for selecting components for the preparation of active and/or selective solid catalysts" and no tangible and concrete method steps are given on how to incorporate the specific materials "selected". Generally when a catalyst is made, definite groups of materials are brought together to make a complex at some specified temperature and pressure and are not merely a mental exercise. One skilled in the art would prefer an order of addition of materials either with or without a solvent used so that one would be able to determine an actual chemical composition made. Applicant's specification gives methodology on how one would select a catalyst but do not give any evidence of an actual catalyst generated only mental exercises on how theoretical catalyst compositions would perform as is evidenced in the article cited by applicant "Development of a Genetic Algorithm for Molecular Scale Catalyst Design", wherein on page 284, the inventor states "The purpose of the present paper is to introduce the use of the GA as a practical tool in catalyst design problems and to demonstrate that, in the case of a model system, the catalyst designs obtained are sensible." According to the MPEP, "A process that consists solely of the manipulation of an abstract idea is not concrete or tangible. See *In re Warmerdam*, 33 F.3d 1354, 1360, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994). See also *Schrader*, 22, F.3d at 295, 30 USPQ2d at 1459." In this case, it does not

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appear that the method used is a concrete or tangible method. There is no definitive list of materials or concrete method of combination of materials therefrom to make a tangible composition, which would be used as a catalyst. See also *In re Brown* 177 USPQ 691 (1973), which states "The fact that Sharpe had actually produced a computer program, not disclosed in the application, to solve the recursive equations in the mathematical model does not demonstrate that the application disclosure would have taught a person of ordinary skill in the art how to make and use the claimed system." The rejection has been maintained.

2. Claim 17 gives a method of "arbitrarily or randomly" preparing catalysts. The Merriam-Webster OnLine Dictionary defines at random as "without definite aim, direction, rule or method". Anything random would be questionable as to whether or not it is patentable subject material under 35 U.S.C. 101 because acts of nature are random and not patentable. Examiner is unsure how a catalyst could randomly be prepared with a method when the definition of random is that it lacks a method. Applicant has not defined claim 17 to include language to clearly state that the random process requires an optimization step while still ensuring a directed optimization through the use of a fitness or cost function as argued on page 21 of the remarks. Employing random number generators are different than applicant's claimed invention "comprising arbitrarily or randomly newly structuring by means of crossing and mutation of steps (d), (g) and (i), selected among the stochastic methods of numerical random-check generators". There is no indication that the randomization is done by

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computer and not as merely a mental exercise. It is also unclear as to what algorithm is supposed to produce said randomization. It is also unclear what would be the fitness or cost functions in claim 17, which steps would ensure convergence of applicant's mathematical algorithm. It is unclear how applicant's method is any different than any other scientist that does not use a computer and randomly picks one or more metals to combine in an amount to create a catalyst, test the catalyst and guess as to what property would cause an improvement of said catalyst by modification in a next step. The rejection has been maintained.

3. The terms "crossing" and "mutation" are used to modify the word "means", thus purporting to conform to 35 USC 112, sixth paragraph. However, 35 USC 112, sixth paragraph, requires that the terms specify a function to be performed, thus enabling a determination of the structural equivalent thereof. For example, expressions such as "latch means" or "means for latching" have functional connotations and are in conformity with the statute. However, in this case, the term has no functional connotations. See *Ex parte Klumb*, 159 USPQ 694. Although applicant may be his/her own lexicographer, it should not be contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "crossing" in claim 17 is used by the claim to mean "exchanging", while the accepted meaning is "(genetics) the act

of mixing different species or varieties of animals or plants and thus to produce hybrids." The term is indefinite because the specification does not clearly redefine the term. The term "mutation" in claim 17 is used by the claim to mean "reduce or enlarge", while the accepted meaning is "a relatively permanent change in hereditary material involving either a physical change in chromosome relations or a biochemical change in the codons that make up genes". Both definitions used are related to biological and biochemical materials not inorganic or organometallic catalyst materials and applicant's meaning came from the specification on pages 9-10 as directed by Applicant. Applicant merely states that steps (d), (g) and (j) are crossed or mutated but no explanation exists as to how these are mutated or crossed (e.g., how crossing or mutation affect the product formed). The rejection has been maintained.

4. The previous rejection regarding "random check generators, throwing dice and/or performing drawings" has been withdrawn because applicant has removed throwing dice and/or performing drawings from the claim language. Should applicant reinstate this language, the rejection will also be reinstated.

Claims Analysis

The explanation given on page 27 of the response of 4/7/2005 is a clearer method for what applicant intends claim but the claims as written do not convey the same meaning as that stated at the bottom of page 27. The claimed method steps are still indefinite because they lack proper reference to what is selected, what is crossed or mutated and what is used to determine the fitness function for the optimization steps.

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Although the specification highlights certain analytical methods, any method used to analyze a catalyst will be considered as appropriate to meet the limitation of claim 15.

Claim Rejections - 35 USC § 102/ Claim Rejections - 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 17 is rejected under 35 U.S.C. 102(e) as being anticipated by Kieken, et al. (US 6763309 B2).

See entire document. Kieken, et al. disclose a catalyst development engine which relies on a knowledge cycle, testing cycle and database. Figure 3a shows a model for specifying reactants, intermediates and products, generation of reaction mechanisms, screening, identification of critical kinetic parameters, testing and "success" and Figure 6 is a example of catalysts generated. Klein, et al. disclose it is known to perform random material discovery in the field of combinatorial chemistry (col. 1, l. 22 – 32) but that a rational approach using a knowledge driven process of integrated scientific and empirical modeling tools are used to build predictive models for selecting certain materials to scale up and produce catalysts that should have higher activity and/or selectivity (col. 1, l. 31-45). Kieken, et al. disclose the use of a Monte Carlo kinetic simulation which is a stochastic method of random number generation (col. 3, l. 4-9, 39-45; col. 12, l. 30-43). The catalyst development engine research process description is also disclosed (col. 5, l. 47 – col. 6, l. 50). Specific mathematical algorithms and models are used in several iterations to aid in the rational development of a catalyst which is active and/or selective by using chemical properties such as bond strength, site acidity, site basicity, oxidation potential or other chemical or physical property (col. 7, l. 41 – col. 8, l. 54; col. 14, l. 23 – col. 15, l. 38). Kieken, et al. disclose that the semi-empirical methods coupled with advanced machine learning methods to develop a potential set of lead catalytic systems which meet targeted properties (col. 8, l. 61 - 67). The testing cycle of a library of proposed materials is synthesized and evaluated (col. 25, l. 50 – col. 26, l. 3).

Claim 17 is rejected under 35 U.S.C. 102(e) as being anticipated by Cawse (US 6728641 B1).

See entire document. Cawse discloses a method and system for selecting a best case set of factors for a chemical reaction, specifically a catalytic reaction as is shown in Figures 6 and 7. Cawse discloses that a researcher provides factors that may impact the reaction or process of interest such as reactants, solvents, carriers, catalysts and chemically inert substances (col. 3, l. 5-20) using a computer algorithm to relate these factors with a software program (col. 3, l. 20-39). There are multiple algorithms that can be used (col. 4, l. 40-65). High throughput screening results are envisioned as factors for input for the algorithm (col. 4, l. 16-22; col. 8, l. 64 – col. 9, l. 6). Catalyst metals used in the compositions are disclosed (col. 9, l. 61-64), cocatalyst, solvent, etc (col. 11 – 12, Table 5). Cawse discloses repeated iterations of a process (col. 9, l. 40) and table 5 shows many possible identities of primary, secondary catalytic metals.

Claim 17 is rejected under 35 U.S.C. 102(e) as being anticipated by or in the alternative under 35 U.S.C. 103(a) as being unpatentable over Deem, et al. (US 6640191 B1).

See entire document. Deem, et al. disclose in Figure 1 both a random number generator (a) and parallel tempering (b) as two different methods to create catalyst compounds as well as the relative figures of merit for each type of method used in Figure 3 to create an active and/or selective catalyst composition (col. 3, l. 11-49; col. 4, l. 5-9; col. 6, l. 22-31). Deem, et al. disclose random, quasi random or other number generators such as Monte Carlo algorithms or a Metropolis algorithm is used with swapping, parallel tempering and a priori probability (col. 5, l. 30-61). The example

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given in example 2 gives a proof of principal experiment using 4 metal components used in different combinations based on the different combinatorial methods (col. 13, l. 39 – col. 14, l. 41).

Claims 17 is rejected under 35 U.S.C. 102(e) as being anticipated by Schultz, et al. (US 6420179 B1).

See entire document. Schultz, et al. disclose in Figure 8 a representative example of the quadrant based modified metals on a chip to determine whether or not superconductivity was present, using a metal oxide compound such as that in Figure 10A or 10B. Schultz, et al. disclose an array of diverse solids, such as covalent network solids, ionic solids, molecular solids for inorganic materials, intermetallic materials, metal alloys, ceramic materials, organometallic materials, composite materials (col. 1, l. 15 – 30; col. 6, l. 30 – col. 7, l. 35; col. 7, l. 59 – col. 8, l. 4). Schultz, et al. disclose approximately 100 elements in the periodic table which can be used to make compositions having 3 or more elements to generate large libraries and algorithms previously used for drug discovery (col. 1, l. 64 – col. 2, l. 49). Schultz, et al. disclose methods of screening the materials to determine activity and/or selectivity (col. 26, l. 65 – col. 27, l. 27; table 1, col. 28, l. 1-44).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cawse (US 6728641 B1) in view of Kudo, et al. (US 3929670 A) or Inoue, et al. (US 6110860 A).

Kudo, et al. and Inoue, et al. disclose multiple metal oxides (Kudo - col. 2, l. 10, 26; col. 31, l. 18-col. 42, l. 36). It would have been obvious to one of ordinary skill in the art to modify the method of Cawse to optimize the catalyst compositions of Kudo, et al. or Inoue, et al. to optimize the catalyst composition and produce a better product.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 17 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of copending Application No. 09/909038. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claim a process for producing new catalysts according to a method of restructuring the original catalyst by means of stochastic methods by crossing a randomly selected group of catalysts with multiple generations of progeny based on mutation to get active or selective variants. The instant application appears to be the species of the genus claimed in 09/909038.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

The examiner has withdrawn rejections related to all currently withdrawn claims, should the currently withdrawn claims be reinstated, the currently withdrawn rejections related to these claims will also be reinstated.

Applicant's arguments filed April 07, 2005, with respect to the 102(b)/103(a) rejection over Petasis (US 6602817 B1), have been fully considered and are persuasive. The previous rejection over Petasis have been withdrawn.

Applicant's arguments filed April 07, 2005 have been fully considered but they are not persuasive over Keiken, et al. (US 6763309 B2). Keiken, et al. disclose an

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arbitrary selection of components which is then reacted and screened then uses recursive partitioning so that optimizations are done to achieve the best catalyst possible as is disclosed in Figure 3a, Table 1 and the argumentation supra. "Iterations" disclosed are optimization methods and the specific algorithm disclosed is the Monte Carlo algorithm. The rejections have been maintained.

Applicant's arguments filed April 07, 2005 have been fully considered but they are not persuasive over Cawse (US 6728641 B1). Cawse discloses a method and system for selecting a best case set of factors for a chemical reaction then use that for experimentation and then use the experimental data for iterative purposes to improve the chemical reactivity of the system disclosed. The rejections have been maintained.

Applicant's arguments filed April 07, 2005 have been fully considered but they are not persuasive over Deem, et al. (US 6640191 B1). Deem, et al. disclose multiple methods and algorithms that are used to design more powerful experimental protocols for combinatorial chemistry which would be easily modified to be used for catalyst compositions, etc. Deem even discloses what applicants claim as "crossing" and "mutation" (col. 8, l. 23-31; see especially col. 11, l. 20-33). The rejections have been maintained.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennine M. Brown whose telephone number is (571) 272-1364. The examiner can normally be reached on M-R 9:30 AM - 7:30 PM; Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jmb


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